

"Electronic control and/or power-supply system for a bicycle, fixable in the same anchoring point as the bottle-cage supporting unit"

\*\*\*

5

TEXT OF DESCRIPTION

The present invention relates to bicycles of the type comprising a frame, a bottle-cage supporting unit fixed to the frame, at least one electronic control device on board the bicycle, and an electronic control and/or power-supply system for said electronic device.

The use of an electronic control and/or power-supply system on board a bicycle has already been proposed in the past, with particular reference to bicycles provided with electronically controlled motor-driven gear change. An example of solutions of this sort is described and illustrated in the US patent No. 5 470 277 filed by the present applicant. For bicycles of the above type there exists the need to have available a housing for the electronic control unit that does not hinder normal use of the bicycle and at the same time enables access for possible replacement or for maintenance operations in an easy and fast way.

With a view to solving the above problem in an efficient way, the subject of the present invention is a containment unit for an electronic control and/or power-supply system in a bicycle of the type specified previously, characterized in that the aforesaid containment unit for the electronic control and/or power-supply system has a conformation designed for being fixed to the bicycle frame in the same point where the bottle-cage supporting unit is fixed.

In a preferred embodiment, the aforesaid containment unit comprises a container for at least one electronic control card and an auxiliary container for an electric power-supply battery. In a preferred

embodiment, the aforesaid containment unit can be fixed to the frame of the bicycle using the same fixing means as those that secure the bottle-cage supporting unit to the bicycle.

5        The invention envisages various embodiments of the general idea of solution described above. For example, in a first embodiment, the bottle-cage support includes a supporting plate which can be fixed to a tube of the bicycle frame, typically the down tube, and moreover 10 includes auxiliary supporting means designed to be set between said supporting plate and the tube of the bicycle frame. In the latter case, the container for the electronic control unit is rigidly connected to the bottom end of said auxiliary means and projects in 15 cantilever fashion therefrom beneath the space designed to receive the bottle.

Preferably, in the aforesaid embodiment, the auxiliary supporting means are provided laterally with elastic clips or clamps for anchoring an elongated 20 sheath constituting the container for the electric power-supply battery. The same auxiliary plate can also be provided, on its side opposite to the one equipped with the aforesaid elastic clamps, with further clamps for anchorage of a pump for inflating the tyres of the 25 bicycle.

In a variant embodiment, the container for the electronic control unit has a flattened body designed to be set between the bottle-cage support and the tube of the frame of the bicycle. Preferably, the said 30 flattened body has, on one of its sides, a sheath designed to receive the electric power-supply battery.

In a further variant embodiment, the container for the electronic control unit is set in a projecting position at the base of the bottle, as in the case of 35 the first embodiment described previously, and moreover

includes, beneath the aforesaid container, a further container for the electric power-supply battery.

Of course, a wide range of modifications are in any case possible to the examples of embodiment described 5 above, without prejudice to the principle of arranging the container for the electronic control unit in association with the bottle-cage supporting unit, preferably using the same fixing screws that are used for fixing the bottle-cage supporting unit to the frame 10 of the bicycle also for anchoring the container carrying the electronic control unit.

Further characteristics and advantages of the present invention will emerge from the ensuing description, with reference to the attached drawings, 15 which are provided purely by way of non-limiting examples and in which:

- Figure 1 is a perspective view of a first embodiment of the bottle-cage supporting unit according to the invention, in the condition where it is mounted 20 on a bicycle frame;

- Figure 2 is an exploded perspective view of the unit of Figure 1;

- Figure 3 is an exploded perspective view at an enlarged scale of the bottle-cage supporting unit of 25 Figure 1;

- Figure 4 is a perspective view of a second embodiment of the bottle-cage supporting unit according to the invention;

- Figure 5 is an exploded perspective view of the 30 unit of Figure 4;

- Figures 6 and 7 are, respectively, a perspective view and an exploded perspective view of a third embodiment of the invention;

- Figures 8 and 9 are, respectively, a perspective 35 view and an exploded perspective view of a fourth

embodiment; and

- Figures 10 and 11 are, respectively, a perspective view and an exploded perspective view of a fifth embodiment of the invention.

5 With reference to Figures 1 and 2, the number 1 designates, as a whole, a bicycle frame of a type in itself known, including a down tube 2 to which a bottle-cage supporting unit 3 according to the present invention is fixed. In the example illustrated, the  
10 bottle-cage supporting unit 3 comprises a support 4 for the bottle (not illustrated) consisting of a bent metal wire rigidly connected to a supporting plate 5 provided with holes 6 for engagement of fixing screws 50 designed to engage corresponding holes 7 made in the  
15 down tube 2 or in any other tube of the bicycle frame. The bottle-cage supporting unit 4 moreover comprises a top auxiliary plate 8 and a bottom auxiliary plate 9 which are set between the plate 5 and the tube 2 of the frame and which have respective holes 10 for engagement  
20 of the same screws 50 that fix the plate 5 to the frame tube 2. In the example illustrated, both of the plates 8 and 9 are made of plastic material and incorporate, in a single piece, two respective clamps 11 for fixing a cylindrical sheath 12 which receives within it the  
25 electrical battery and which is provided with a closing lid 14. The bottom plate 9 is rigidly connected to a container 15 for an electronic control unit which is supplied by the battery 13 and which is associated to a motor-driven gear-shifting system with which the  
30 bicycle is equipped. The structure described above can be better seen in Figure 3, where the container 15 is illustrated in the exploded condition, with the lid 16 made of a single piece of plastic material with the bottom plate 9. The lid 16 can be fixed by means of  
35 screws 17 to a tray-shaped body 18 made of plastic

material which receives, inside it, the electronic control unit 19. The latter includes a connector 20 for a cable 21 designed to be connected to a pedalling-cadence sensor, with which the bicycle is provided, a 5 connector 22 for a cable 23 designed to be connected to the electric motor for controlling the front derailleur of the bicycle, a connector 24 for a cable 25 designed to be connected to an electric motor for controlling the rear derailleur of the bicycle, a connector 26 for 10 a cable 27 designed to be connected to the display unit mounted on the handlebars of the bicycle, and a connector 28 for a cable 29 connected to the battery 13 which is received inside the sheath 12.

Thanks to the structure and arrangement described 15 above, the bottle-cage supporting unit according to the invention is able to perform the supplementary function of supporting the electronic control unit 19 and the corresponding power-supply battery 13. The said components are thus mounted on the bicycle in a 20 position in which they do not in the least hinder normal use of the bicycle and in which they are, at the same time, immediately and readily accessible for a possible replacement or for maintenance operations.

Figures 4 and 5 illustrate a solution substantially 25 identical to that of Figures 1-3, differing from the latter only in that the two auxiliary plates 8, 9 are provided on one side, with the two elastic clamps for supporting the container 12 of the electric power-supply batteries 13, and on the other side with two 30 elastic clamps 11a for supporting a manual pump 30, of any known type, usable for inflating the tyres of the bicycle.

Figures 5 and 6 illustrate a variant in which the 35 container for the electronic control unit consists of a flattened body 31 which is set between the plate 5 for

carrying the bottle-cage supporting unit and the tube 2 of the frame and which includes two holes 32 for engagement of the fixing screws. The same container 31 incorporates, on one side, a sheath 33 for the 5 batteries 13.

Figures 8 and 9 illustrate a further variant of the solution of Figures 1-3, in which the two plates 8, 9 are replaced by a single elongated plate 34 which has holes 10 for the fixing screws and is rigidly connected 10 to the container 15 (which has the structure illustrated in Figure 3). In this case, however, the clamps 11 are not provided, and the batteries 13 are housed in an auxiliary container 35 made beneath the main container 15.

15 Finally, Figures 10 and 11 illustrate a variant of the solution of Figures 8 and 9, which differs from the latter only as regards a different conformation of the bottle-cage support 4, which in this case includes a continuous containment wall 36 that is integrated in 20 the body serving as a container for the electronic control unit.

Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary widely with respect to what is 25 described and illustrated herein purely by way of example, without thereby departing from the scope of the present invention.